

**OFFADENS, A NEW GENUS OF SMALL MINNOW MAYFLIES
(EPHEMEROPTERA: BAETIDAE) FROM AUSTRALIA**

C. R. LUGO-ORTIZ AND W. P. MCCAFFERTY

Department of Entomology, Purdue University, West Lafayette, IN 47907, U.S.A. (e-mail: carlos_lugo-ortiz@entm.purdue.edu).

Abstract.—*Offadens*, new genus (Ephemeroptera: Baetidae), is described and includes the Australian *O. sobrinus*, new species, and *O. soror* (Ulmer), new combination. The genus is unique among baetid larvae because of the presence of a small tooth between the incisors and prostheca of the right mandible. *Offadens sobrinus* is described from larvae from New South Wales, and is distinguished from *O. soror* by the deeply cleft incisors of the right mandible and longer and narrower segment 2 of the labial palps with a narrow distomedial process. The morphology of the maxillary palps of *O. soror* is discussed.

Key Words: Ephemeroptera, Baetidae, *Offadens*, new genus, new species, new combination, Australia

Small minnow mayflies (Ephemeroptera: Baetidae) are poorly known in Australia. Thirteen species in the genera *Baetis* Leach (4 spp.), *Bungona* Harker (1 sp.), *Centroptilum* Eaton (2 spp.), *Cloeon* Leach (5 spp.), and *Pseudocloeon* Klapálek (1 sp.) have been known historically, and Lugo-Ortiz and McCafferty (1998) recently described two new species of *Cloeodes* Traver from the eastern part of the continent. The taxonomic status of those Australian species assigned to *Baetis*, *Centroptilum*, and *Pseudocloeon* is uncertain because of outmoded generic concepts. This dearth of faunistic data on Australian Baetidae stands in marked contrast to the knowledge of most other mayfly families reported from the continent, presumably because baetids are generally small and therefore difficult to collect and study.

We herein describe a new genus of Baetidae from Australia. We describe a new species based on larvae collected from the southeastern part of the continent and assign to the new genus one of the species originally described in *Baetis*. Except where oth-

erwise noted, the specimens studied are housed in the Purdue Entomological Research Collection, West Lafayette, Indiana.

***Offadens* Lugo-Ortiz and McCafferty,
new genus**

Larva.—*Head:* Labrum (Fig. 1; Suter 1986: Fig. 21j, k) with anterior margin almost straight and with deep anteromedial notch. Hypopharynx (Fig. 2; Suter 1986: 21r) with lingua with distomedial convexity. Left mandible (Fig. 3; Suter 1986: 21n, o) with incisors fused; prostheca robust, apically denticulate. Right mandible with incisors fused (Suter 1986: 21p, q) or deeply cleft (Fig. 4); prostheca slender, medially with minute, fine, simple setae; small tooth between prostheca and mola and at base of mola. Maxillary palp (Fig. 5) two segmented, extending beyond galealacinia. Labium (Fig. 6; Suter 1986: 21m) with glossa subequal in length to paraglossa; palp three segmented; segment 2 with distomedial projection. *Thorax:* Legs (Fig. 7; Suter 1986: 21f) with femora lacking villopore; tarsal claws (Fig. 8; Suter 1986: 21g) elon-

gate. *Abdomen*: Terga (Fig. 9) with abundant small scale bases and regularly spaced marginal spines posteriorly. Gills (Fig. 10; Suter 1986: 21i, i') platelike, held dorsolaterally, with minute marginal serrations and fine, simple setae. Paraproct (Fig. 11; Suter 1986: 21h) with marginal spines. Cercus with abundant short, fine, simple setae medially; terminal filament with abundant short, fine, simple setae laterally.

Adult.—Forewing (Suter 1986: Fig. 21a) with paired marginal intercalaries. Hindwing (Suter 1986: Fig. 21b) with small, acute costal projection in basal one third; three longitudinal veins present, middle vein forked. Male genital forcep (Suter 1986: Fig. 21d) three segmented; segment 2 strongly bowed inwardly; segment 3 elongate, ellipsoidal.

Etymology.—The generic name is a combination of the Latin words *offa* (morsel) and *dens* (tooth). It is in reference to the small tooth between the incisors and mola of the right mandible of the larva. The name is masculine.

Type species.—*Offadens sobrinus* Lugo-Ortiz and McCafferty, new species.

Species included.—*Offadens sobrinus* Lugo-Ortiz and McCafferty, new species; *O. soror* (Ulmer), new combination.

Distribution.—Australia: New South Wales, South Australia, Tasmania, Western Australia.

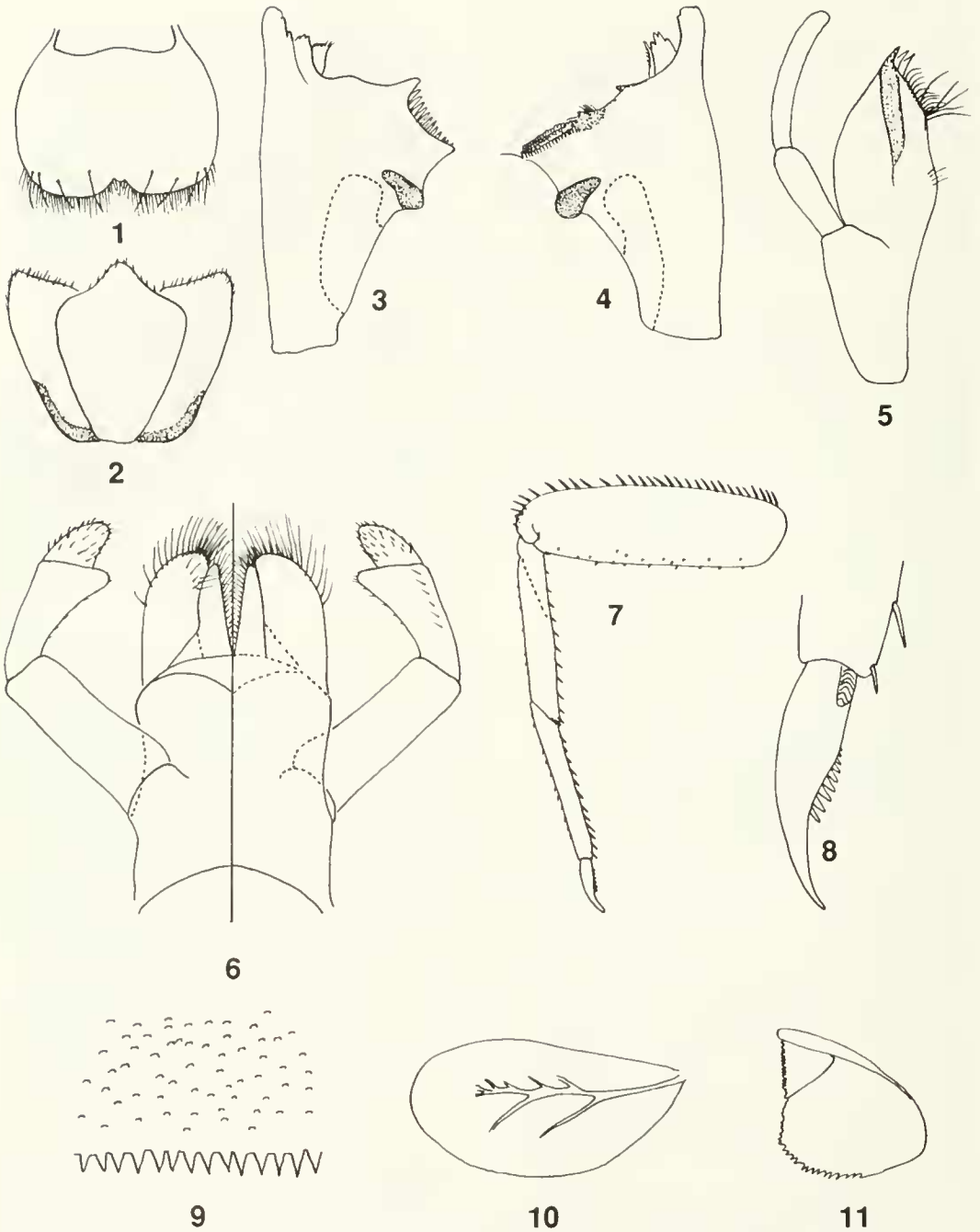
Discussion.—*Offadens* is similar to *Baetis* in several respects, but is not a member of the *Baetis* complex of genera (see, e.g. Waltz et al. 1994, Lugo-Ortiz and McCafferty 1997). The presence of a small tooth between the prostheca and mola of the right mandible (Fig. 4; Suter 1986: Fig. 21p) and the lack of the femoral villopore (Waltz and McCafferty 1987: Figs. 1, 4, 5, 12, 17) clearly distinguish larvae of *Offadens* from those of *Baetis* and its cognate genera. Adults of *Offadens* cannot be adequately distinguished at this time from those of other baetid genera with double marginal intercalaries in the forewings.

Apart from the fact that *Offadens* cannot

be considered to belong to the *Baetis* complex of genera because it lacks the villopore, its phylogenetic relationships cannot be determined at this time. It is possible that *Offadens* is endemic to Australia as we have not seen other baetids with a similar right mandibular tooth. Cognate taxa may come to light as the baetid fauna of Australia and Southeast Asia are more thoroughly examined and documented.

***Offadens sobrinus* Lugo-Ortiz and
McCafferty, new species**
(Figs. 1–11)

Larva.—Body length: 4.5–5.5 mm. Caudal filament length: 2.3–2.8 mm. *Head*: Coloration pale yellow-brown, with no distinct pattern. Antenna approximately 2.5× length of head capsule. Labrum (Fig. 1) with submarginal row of four to six long, fine, simple setae. Hypopharynx as in Fig. 2. Left mandible (Fig. 3) with outer set of incisors with one large and two small denticles; inner set with four small denticles. Right mandible (Fig. 4) with outer incisors with large, thumblike denticle and inner incisors with four denticles. Maxillary palp (Fig. 5) two segmented; segment 1 approximately 0.68× length of segment 2. Labium (Fig. 6) with palp segment 1 as long as segments 2 and 3 combined; segment 2 approximately 2.5× length of segment 3, with narrow distomedial process and four to six short, fine, simple setae dorsally; segment 3 subconical, with abundant short, fine, simple setae scattered over surface. *Thorax*: Coloration pale yellow-brown, with no distinct pattern. Hindwing pads present. Legs (Fig. 7) with femora with row of long, robust, simple setae dorsally and short, stout, simple setae scattered ventrally; tibiae with row of robust, simple setae ventrally, slightly increasing in length distally, and minute, fine, simple setae dorsally; tarsal claws (Fig. 8) slightly elongate, with 8–10 denticles. *Abdomen*: Coloration pale yellow-brown, with no distinct pattern. Terga (Fig. 9) with abundant scale bases and regularly spaced posterior marginal spines; spines ap-



Figs. 1-11. *Offadens sobrinus*. 1, Labrum (dorsal). 2, Hypopharynx. 3, Left mandible. 4, Right mandible. 5, Left maxilla. 6, Labium (left-ventral; right-dorsal). 7, Right foreleg. 8, Tarsal claw. 9, Tergum 4 (detail). 10, Gill 4. 11, Paraproct.

proximately 1.5× longer than basal width. Gills (Fig. 10) on abdominal segments 1–7, platelike, with translucent tracheation. Paraproct (Fig. 11) with 16–18 marginal spines. Cercus pale yellow-brown; terminal filament approximately 0.78× as long as cercus.

Adult.—Unknown.

Material examined.—Holotype: Larva, AUSTRALIA, New South Wales Prov., Chandler R., 26 mi E of Armidale, II-19-1966, G. F. Edmunds, Jr. Paratypes: 16 larvae, same data as holotype [mouthparts, forelegs, tergum 4, gill 4, and paraproct of one larva mounted on slide (medium: Euparal)] (two larvae deposited in the Australian National Collection, Canberra). Additional material: 71 larvae, same data as holotype; 28 larvae, AUSTRALIA, New South Wales Prov., Commissioner's Waters, 4 mi E of Armidale, II-19-1966, G. F. Edmunds, Jr.

Etymology.—The specific epithet is the Latin word for cousin.

Discussion.—*Offadens sobrinus* is distinguished from *O. soror* (see below) by the deeply cleft incisors of the right mandible (Fig. 4) and the longer and narrower segment 2 of the labial palps with a narrow distomedial process (Fig. 6).

Offadens soror (Ulmer), **n. comb.**

Baetis soror Ulmer 1908:44 (male, female adults); Suter 1986:354 (larva).

Material examined.—AUSTRALIA, New South Wales Prov.: 5 larvae, Bobundara Cr., 3 mi N of Maffra, I-22-1966, G. F. Edmunds, Jr.; 2 larvae, Commissioner's Waters, 4 mi E of Armidale, II-19-1966, G. F. Edmunds, Jr.; 1 larva, Cabbage Tree Cr., at highway, Clyde Mtn., II-28-1966, G. F. Edmunds, Jr. [mouthparts, forelegs, and tergum 4 on slide (medium: Euparal)]; 1 larva, Mt. Kosciusko, creek, 1700 m, 4.5°C, IX-23-1966, J. Illies; 1 exuvia, 2 female subimagos, Commissioner's Waters, 9 mi E of Armidale, on Gare Rd, rapids, X-7-1974, M. N. and R. M. Winokur; Tasmania: 1 lar-

va, Clarence R., below Clarence Lagoon, II-1-1966, G. F. Edmunds, Jr.

Discussion.—*Offadens soror* is distinguished from *O. sobrinus* (see above) by the fused incisors of the right mandible (Suter 1986: Fig. 21p, q) and the shorter segment 2 of the labial palps with a small distomedial process (Suter 1986: Fig. 21m).

Suter (1986: Fig. 211) indicated that the maxillary palps of *O. soror* were three segmented. Our examination of specimens of *O. soror* revealed only two segments. We expect that Suter's (1986) depiction of a third segment is due to a mounting artifact, as in some specimens the tip of segment 2 of the maxillary palps tends to constrict somewhat when mounted. On the other hand, if correctly depicted, Suter's specimens possibly represent a variant of the species.

ACKNOWLEDGMENTS

We thank G. F. Edmunds, Jr. (Salt Lake City, Utah) for the donation of the material used in this study. This paper has been assigned Purdue Agricultural Research Program Journal No. 15486.

LITERATURE CITED

- Lugo-Ortiz, C. R. and W. P. McCafferty. 1997. New genus and redescription for African species previously placed in *Acentrella* (Ephemeroptera: Baetidae). Proceedings of the Entomological Society of Washington 99: 429–439.
- . 1998. First report and new species of the genus *Cloodes* (Ephemeroptera: Baetidae) from Australia. Entomological News 109: 122–128.
- Suter, P. J. 1986. The Ephemeroptera (mayflies) of South Australia. Records of the South Australian Museum 19: 339–397.
- Ulmer, G. 1908. Trichopterae und Ephemeridae. Die Fauna Südwest-Australiens 2: 25–46.
- Waltz, R. D. and W. P. McCafferty. 1987. Systematics of *Pseudocloeon*, *Acentrella*, *Baetella*, and *Liebiella*, new genus (Ephemeroptera: Baetidae). Journal of the New York Entomological Society 95: 553–568.
- Waltz, R. D., W. P. McCafferty, and A. Thomas. 1994. Systematics of *Alainites* n. gen., *Dipheter*, *Indobaetis*, *Nigrobaetis* n. stat., and *Takobia* n. stat. (Ephemeroptera, Baetidae). Bulletin de la Société d'Histoire Naturelle de Toulouse 130: 33–36.